conate after every 1500 cc. of rapidly transfused whole blood or plasma is generally sufficient. . . . Such conditions as existing or impending shock, disturbed cardiac function and loss of large quantities of blood without adequate and rapid replacement caused a large number of these patients to show evidence of anoxia of the stagnant type. The oxygen saturation of the circulating hemoglobin should approach normal levels at all times and the photoelectric oxyhemograph provides a rapid method for making such determinations. Spinal anesthesia has a definite advantage over other methods since a concentration of 100 per cent oxygen can be administered continuously by mask to these hypoxic individuals without danger of lightening the depth of anesthesia." A. A.

ARNER, O., AND DIAMANT, H.: *Respiratory Tract Lesions Following Intratracheal Anaesthesia.* Acta Chir. Scandinav. **101**: 75–84. 1951.

"Intratracheal anesthesia has some drawbacks which are due to the insertion of instruments and tubes into the respiratory tract and the injury possibly resultant from this procedure. . . . Of recent years intratracheal anaesthesia has been employed in a large number of cases at the Karolinska Sjukhuset. The general impression was that this technique of anaesthesia did not to a larger extent entail complications involving the upper respiratory tract. Since it might seem valuable to collect evidence as to possible injury and discomfort after intratracheal anesthesia, the present writers have examined a series of patients who had undergone anaesthesia of this type. The series comprises 112 patients, who were carefully examined by inspection of the fauces and vocal cords both prior and subsequent to operation, the latter repeatedly. . . . The authors were able to demonstrate that in a proportion of the instances, changes which can be safely attributed to merely the pressure of the inserted tube, develop in the fauces and laryngeal meatus. Major surgery in the neck will in many cases entail changes within the fauces and larynx, which are probably due principally to the operation performed. Traumatic lesions on the faucial pillars may be deleterious especially to the epiglottis. On the other hand, the vocal cords seem to be fairly resistant to injury. All these changes are quite transient and cause but mild discomfort to the patients. Vocal cord granulomas or other late changes were not observed."

A. A.

CULLEN, S. C.: *Recent Advances in Anesthesiology.* Wisconsin M. J. **50**: 351–364 (April) 1951.

"In so many fields in medicine—and anesthesiology is no exception—the truly significant advances have been the result of the introduction into clinical practice of new and revised fundamental concepts in the basic sciences. The process of the production of complete insensibility to pain on a regional basis or the induction of complete unconsciousness by drugs is relatively recent and elemental. Constant search goes on for new mechanisms for the depression of the perceptive functions and for more complete understanding of the alterations in tissue activity associated with the depression of function. . . . The use of the many drugs available to the anesthetist on a sound physiologic and pharmacologic basis constitutes a significant advance in the field. The drugs and technic to be discussed are used with a deliberate and calculated effort to provide more safe and satisfactory anesthesia for the patient and surgeon, and in this respect there is

reasonable evidence to support the impression that some degree of success has been accomplished. . . .

"It should be emphasized at the outset that the basic agent in the technic is nitrous oxide and that, although many other drugs may be used, their function is adjunctive or supportive to permit the use of nitrous oxide in non-hypoxic concentrations, to provide muscular relaxation, or to enhance analgesia. . . . It is imperative that the reflex irritability and metabolic activity of the patient be considerably reduced before nitrous oxide or other relatively less potent agents are employed. This can be accomplished by the judicious use of depressant drugs in the preanesthetic period and during the administration of the nitrous oxide. . . . It might be expected that the relatively large doses of depressant drugs required in this technic would seriously impair respiratory and circulatory function. In a study designed to investigate this problem, 30 patients were studied after the administration of the combinations and amounts of drugs mentioned. It was found that there was a statistically significant depression of tidal exchange but that there was also a compensatory increase in respiratory rate, with the result that the minute volume exchange was not seriously influenced. . . . Barbiturate is used for the purpose of inducing a significant degree of hypnosis and reduction of metabolic activity. . . . Morphine and its substitutes, such as Demerol, are used for the production of significant degrees of analgesia and also for the depression of metabolism and reflex irritability. . . . Used with these pharmacologic properties in mind, the different drugs can be administered selectively for specific functions. . . .

"Nitrous oxide is administered by the semiclosed carbon dioxide absorption technic with a constant flow of 3.5 liters of nitrous oxide and 1.5 liters of oxygen per minute. The oxygen concentration may be adjusted upwards if the patient's condition requires it, but the oxygen concentration must not be reduced. Either the to-and-fro or circle absorption method may be used. After the administration of either the morphine or the Demerol as premedication, small doses of pentothal may be given to facilitate rapid induction. Near the termination of the anesthetic procedure, small doses of pentothal may be given also to provide short term hypnosis and reduction of metabolism. . . . In many anesthetics for abdominal operative procedures, it is advisable to intubate the patient. . . . With appropriate amounts of curare, there is satisfactory relaxation of the mandible and pharyngeal tissues, with a relatively minimal degree of respiratory paralysis and a significantly reduced tendency for laryngospasm. Under this type of medication, there is usually ample time for intubation, and for purposes of instruction it compares favorably with deep ether anesthesia. Obviously, in order to use nitrous oxide for anesthesia for abdominal operations, it is necessary to use curare or a similar drug for muscle relaxation. . . .

"This technic cannot be used safely and satisfactorily unless the anesthetist is familiar with the properties of the drugs used and is able to determine critically the responses of the patient. It is not a method in which types of drugs, amounts of drugs, times of application, etc., can be set forth in a routine. The anesthetist must exercise for each patient and each operative requirement his abilities both as a scientist and a clinician. By such exercise is may be expected that additional advances may be made." A. A.